Instruction Manual

CyberScan pH 1500

Bench pH/mV Meter

EUTECH INSTRUMENTS

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PREFACE

Thank you for selecting the Eutech Instruments CyberScan pH 1500 bench meter.

The instruction manual serves to explain the use of the CyberScan pH 1500 bench meter as a step-by-step operational guide to help you familiarize with the meter's features and functions. It is structured sequentially with illustration of diagrams that explains the various functions and setup menus available.

This manual is written to cover as many anticipated applications and uses of the CyberScan pH 1500 bench meter as possible. If there are doubts in the use of the meter, please do not hesitate to contact the nearest Eutech Instruments' Authorised Distributors or call us at (65) 6778-6876 for Eutech Instruments' Customer Service Dept. for assistance.

Kindly remember to complete the warranty card and mail it back to your Authorized Distributors or Eutech Instruments Pte Ltd.

Eutech Instruments reserve the rights to change, make improvement and modify specifications without prior notice and cannot accept any responsibility for damage or malfunction to the instrument caused by improper use.

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1 INTRODUCTION

1.1 Introducing the CyberScan Series

Thank you for selecting the Eutech Instruments CyberScan pH1500 bench-top meter. This instruction manual describes the operation of the meter. The state-of-art meter that you have purchased is easy to operate and will guide you through the various functions by displaying easy to understand prompts. This manual should answer any questions that might arise in operating your meter, however, do not hesitate to call our Technical Support at (65) 6778 6876 (ext 839) or fax at (65) 6773 0836.

This instruction manual is designed to provide all the information necessary to guide you through the process of measuring pH or mV with a series of prompts on the screen.

You will find this symbol appearing in this manual; it indicates useful tips that ease your meter operation.

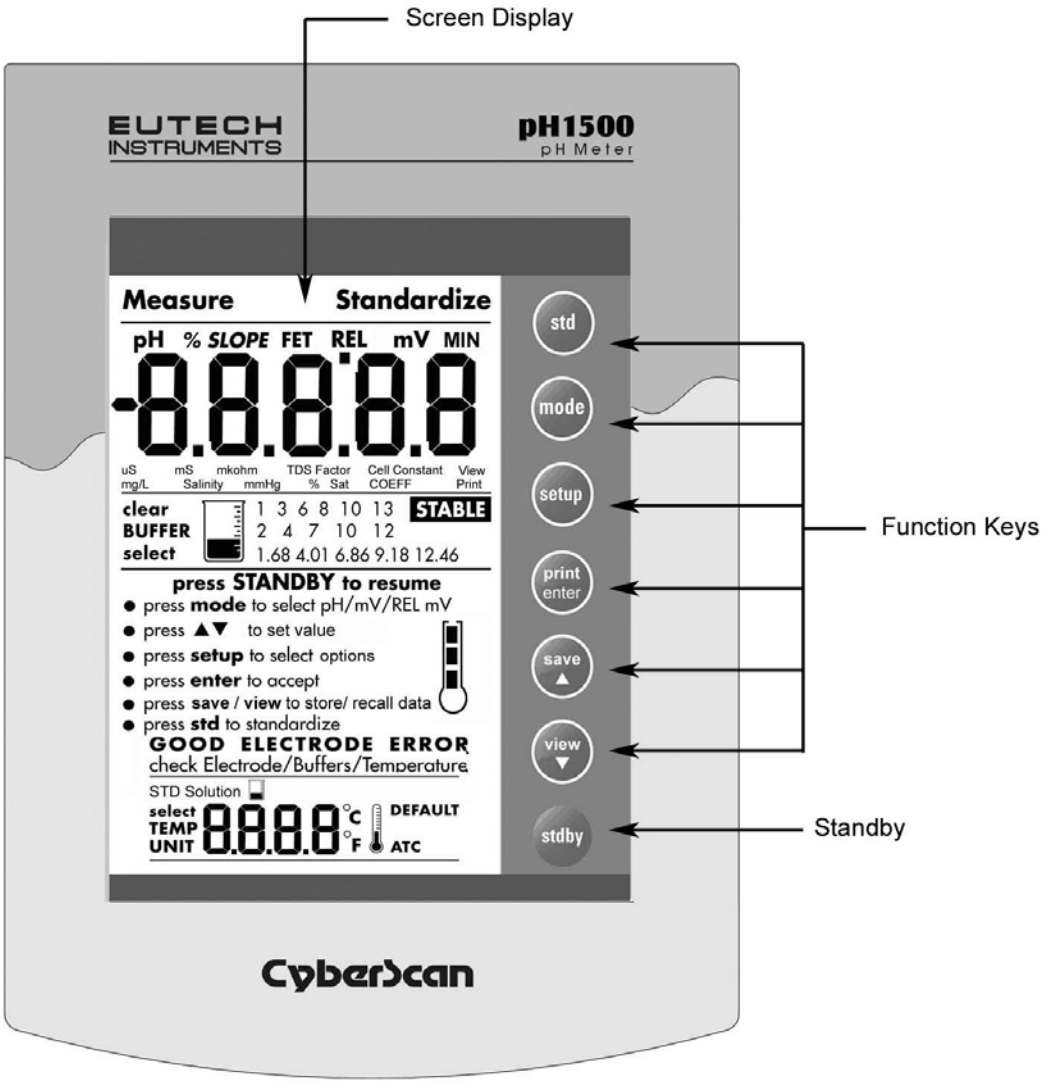
The CyberScan pH1500 meter provides microprocessor precision in a compact benchtop design that is easy to use. This metre allows you:

- Measure pH, absolute mV or relative mV
- Select one of three sets of standard buffer groups
- Standardise with up to five buffers

It all adds up to rapid, completely automatic, intuitive operation.

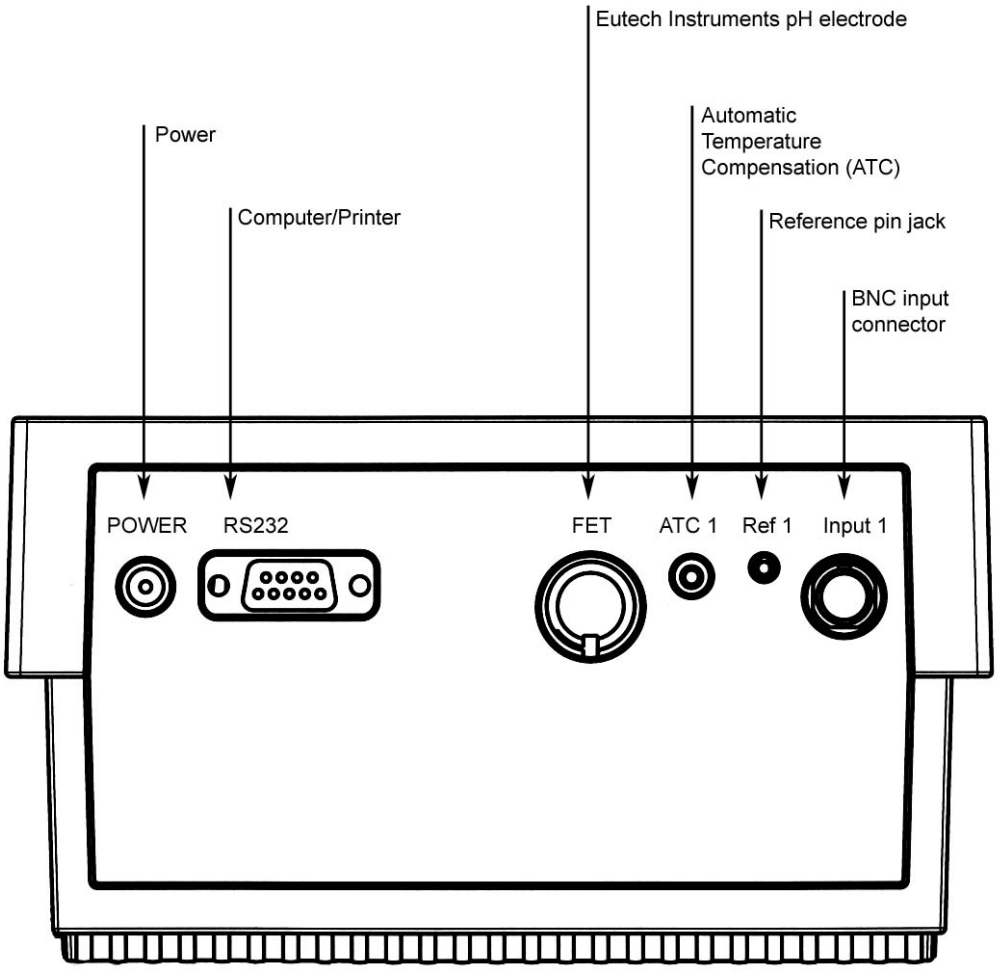
2 GETTING STARTED

2.1 Meter Overview

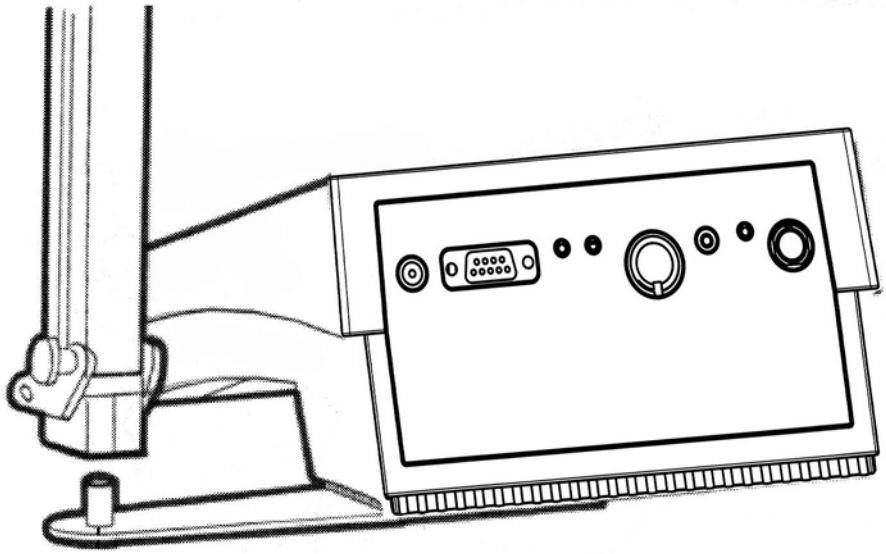


2.2 CONNECTORS

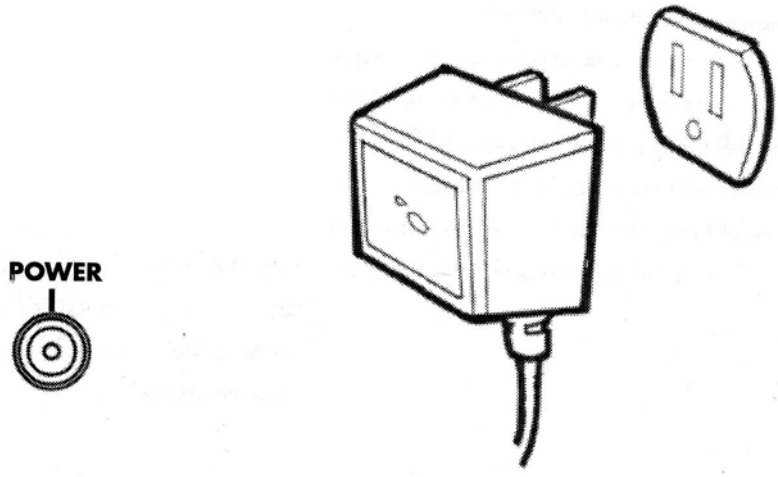
1. Review the layout and arrangement of the rear connector panel.



2. Connect the electrode arm to the base.



3. Connect the power cable to the connector cable to the rear connector panel power jack and to a power source.

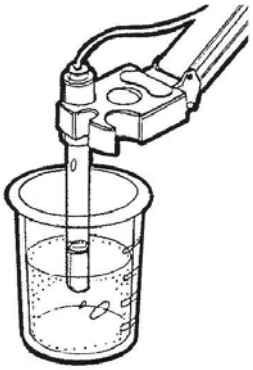


3 USING THE METER

3.1 Electrodes

This meter allows you to use two types of electrodes: the conventional glass pH electrode and the Eutech Instruments field effect transistor (FET) pH electrode. If both types of pH electrodes are connected, the meter will read the FET electrode.

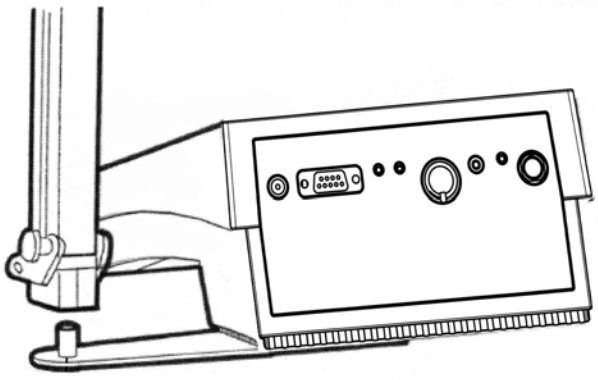
1. Carefully remove the protective cover from the end of the electrode. Before first using your glass pH electrode, or whenever the pH electrode is dry, soak it 2-4 hours in electrode storage solution, pH 4 buffer, or KCl solution.



2. Remove the shorting cap on BNC connector. Install the **combination pH electrode** by plugging it into the BNC input connector (Twisting to lock in place).

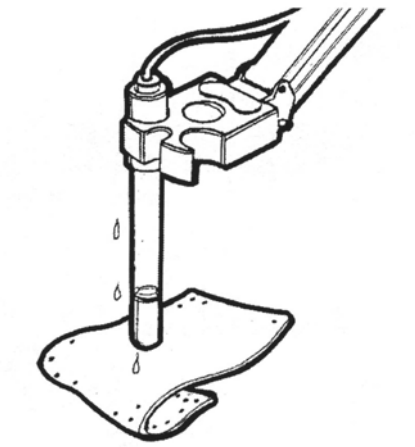
If a combination electrode isn't used, install the **indicating pH electrode** into the BNC input connector. Plug the **reference electrode** into the reference pin jack. Also, install the **ATC probe** into the ATC jack.

Option: install the optional **FET electrode** by plugging it into the FET jack on the back meter panel. Allow the Eutech Instruments electrode to warm up five minutes before use.



☞ Do not discard the BNC shorting cap.

3. Rinse and blot-dry (don't wipe) electrodes between each measurement. Rinse electrodes with distilled or deionised water, or a portion of the next solution to be measured.



4. Between measurements, store conventional pH electrodes storage solution, pH 4 buffer, or KCI solution. Always leave the filling hole of liquid filled combination electrodes open. Refill when the level of solution gets below the manufacturer's recommended level.

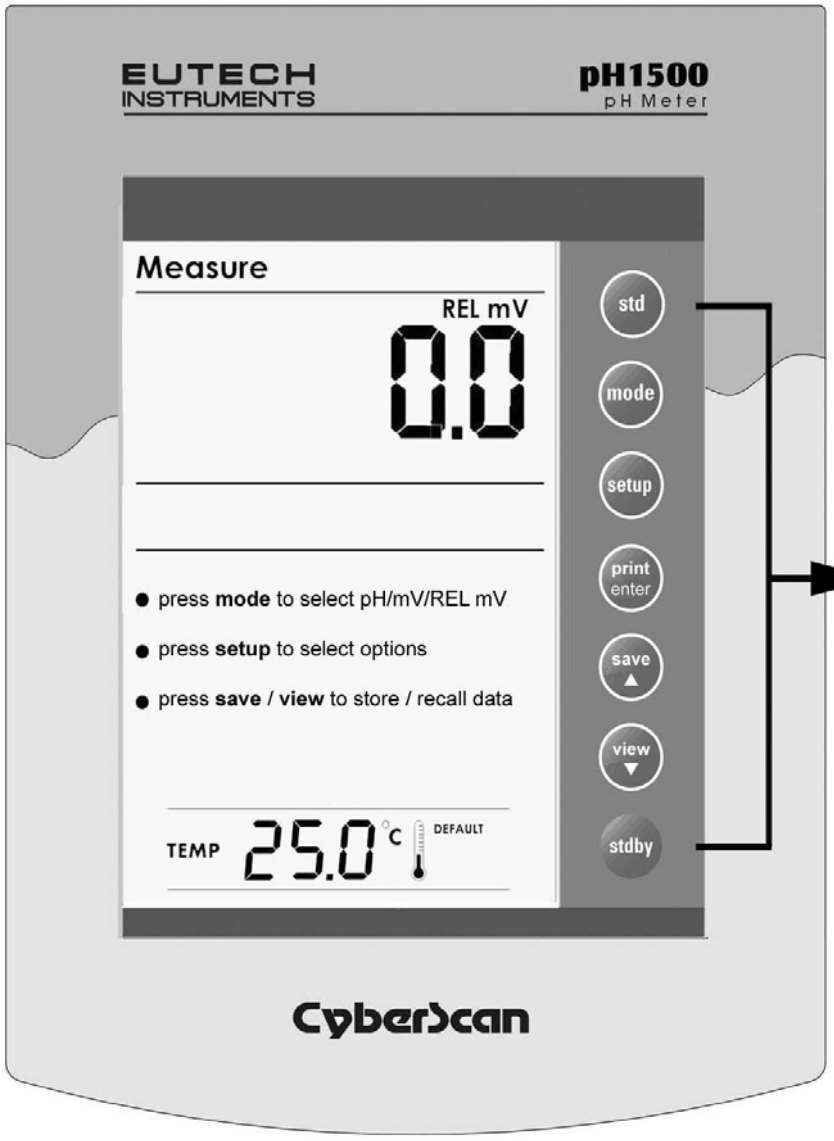
☞ Proper electrode care is fundamental for obtaining reliable pH measurements. Improper care of the electrode may cause the meter reading to drift, respond slowly, or produce erroneous readings. For this reason, the electrode should always be conditioned and used in accordance with manufacturer's instructions.

3.2 Temperature Probe

For more accurate pH measurement, a temperature probe (supplied with the meter) is used for Automatic Temperature Compensation (ATC). Once the temperature probe is connected into its socket (located at the back of meter), the ATC icon is displayed on the screen to indicate that the meter is in ATC Measure mode. If the temperature probe is not connected the meter displays 25.0 ^{o}C or 77 ^{o}F as the default temperature value. When in ATC mode, the meter allows fine offset temperature adjustment of ±5.0 ^{o}C (±9.0 ^{o}F) from mV mode by pressing the **std** key. Use ▲ or ▼ key to set the desired value and press **enter** key to confirm. The meter returns to the Measure mode.

3.3 Display / Keys

Overview of the meter screen display and function key layout.



Press **std** key to initiate standardization. Or press **std** key at the Standardize mode allows you to exit and return to Measure mode.

Press **mode** to select pH, mV and Relative mV.

Press **setup** key to access setup for configuration of meter setting.

Press **print** key to print stored data from memory or current reading to a PC or printer (depending on meter setup).

Press **enter** key to confirm selection or change being made.

Press ▲ key to increment value or scroll up selection.

Press ▼ key to decrement value or scroll down selection.

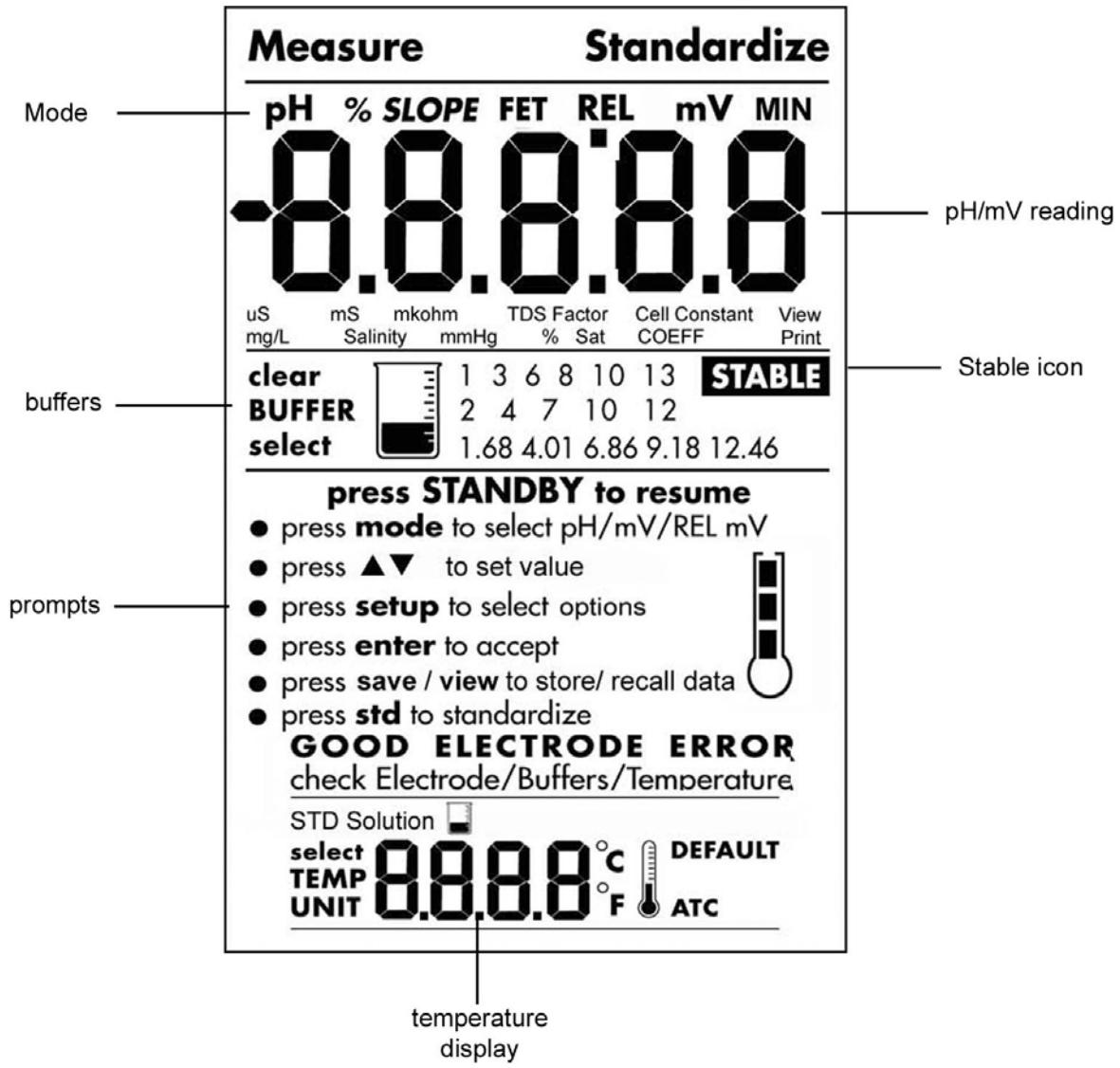
Press **save** key to store displayed data into memory

Press **view** key to recall and select memory location of stored data

Press **stdby** key to start up or put the meter in standby mode.

3.4 Screen Display

Familiarise yourself with the layout of the digital screen display.



4 SETUP MENUS

4.1 Using the Meter

The **setup** button brings you to the setup menus of the various parameters. Press **setup** while in measurement OR standardization to access to the setup menus. The ▲ and ▼ keys allow you to change several operating parameters. While in the setup mode you may:

Press the **std** key at any time to return to the Measure screen without making a change or selection in the setup mode. Note new change will not be effected as no confirmation is done.

Press the **setup** key anytime to access the setup mode in the measurement mode. The menu displays the first setup menu P1.0.

Press the **enter** key to accept a change or selection of desired option in the displayed parameter. The meter will then return to the next setup

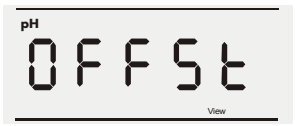
Press the ▲ and ▼ keys to scroll through (increment and decrement setup menu respectively) the remaining selection options available.

In the setup mode, there are 12 setup menus for you to change the operating parameters to suit your individual preference as well as to configure RS232 communication interface protocol for printing.

While you are in each parameter Measure mode, pressing **setup** key allows you to access all 12 setup menus (P1.0 to P12.0) in the pH mode and other setup menus for mV and Relative mV modes. Refer to *Overview of Setup Menus* below.

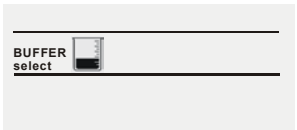
Mode	**Setup Menus Accessible**
pH	P1.0 to P12.0
mV	P5.0 to P11.0
REL mV	P5.0 to P11.0, P13.0 & P14.0

☞ If you do not wish to make a selection or change the option, pressing **std** key at any point of time allows you to abort the setup menu and return to the Measure mode.

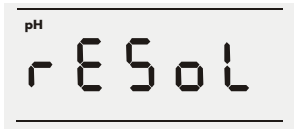


P1.0
View pH electrode offset
- Allows you to view pH electrode offset in mV after 1-point standardization.

P2.0
View pH electrode slope
- View the pH electrode slope in % after 2-point standardization is successfully done.



P3.0
pH buffer group
- Select from 3 different buffer groups, each containing 5-6 buffers, for auto buffer recognition.



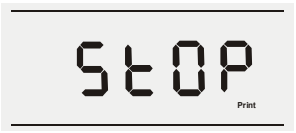
P4.0
pH resolution
- Select various pH resolution either 0.1, 0.01 or 0.001.

P5.0
Temperature Unit
- Select unit of measure for Temperature either in °C or °F.

P6.0
Stability Indicator
-Set the stability indicator to be displayed on the screen.

P7.0
Baud Rate
- To set the baud rate (bits of second) of the communication protocol interface.

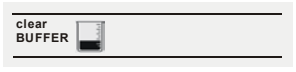
P8.0
Parity Bit
- Set the parity bit of the communication protocol interface.



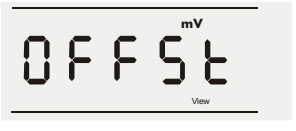
P9.0
Stop Bit
- Set the stop bit of the communication protocol interface.

P10.0
Print Data
- To print current displayed data or data stored in the meter's memory to a computer or printer via Rs232.

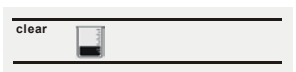
P11.0
Clear Stored Data
- To clear all stored data sets for new data to be stored.



P12.0
Clear Buffer Values
- To clear the standardized buffer values.



P13.0
View mV offset

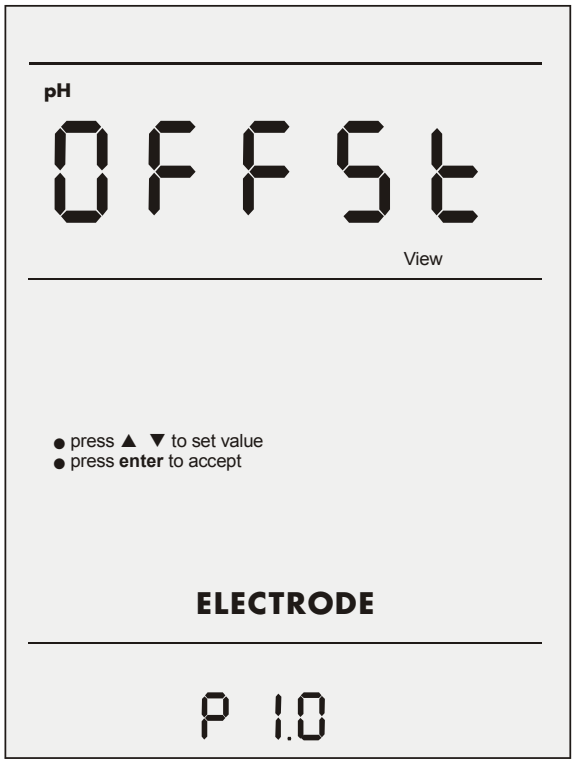


P14.0
Clear mV offset
-Select to clear of retain mV offset stored earlier.

Overview of Setup menus

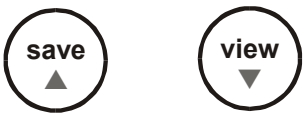
4.1.1 P1.0 View pH Electrode Offset

This setup menu allows you to view the pH electrode offset in mV after 1-point standardization is successfully done.

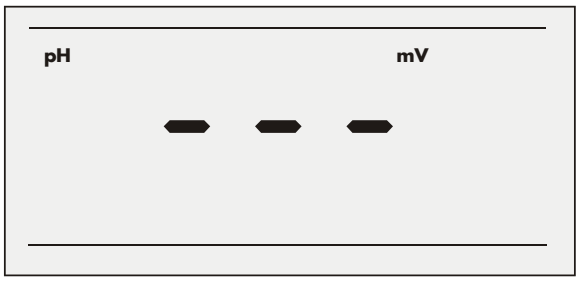


To view pH electrode offset

1. Access View the pH electrode offset menu from pH measurement screen by pressing setup key
2. Press ▲ and ▼ keys to scroll until display shown as above.

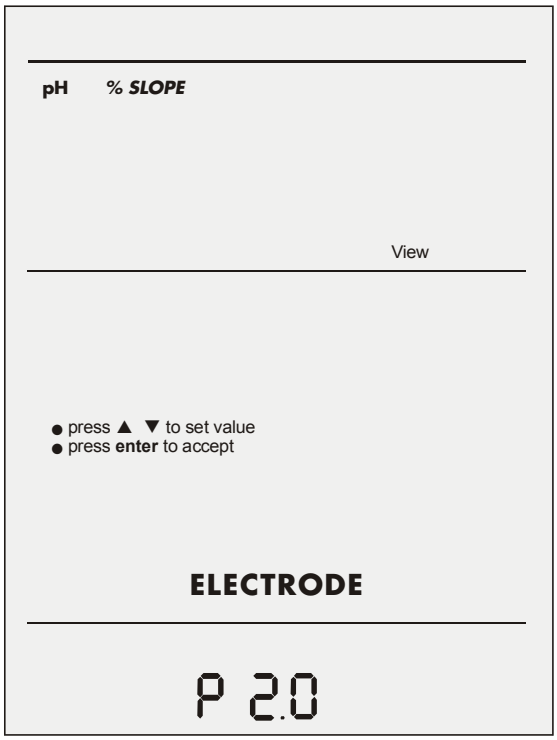


3. Press enter to view the offset. A series of dashes "- - -" will be displayed if the unit has not been standardized.



4.1.2 P2.0 View pH Electrode Slope

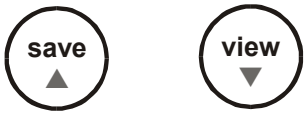
This setup menu allows you to view the pH electrode slope in % after 2-point standardization is successfully done.



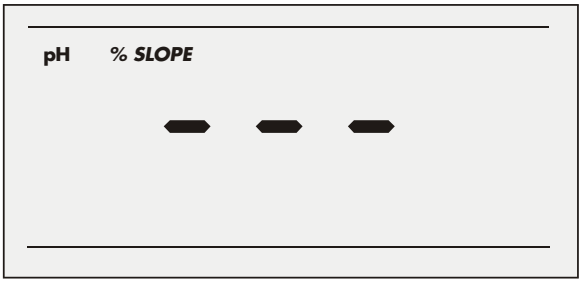
To View pH Electrode Slope

1. Access the View pH Electrode Slope menu from the pH Measure screen by pressing the **setup** key.

2. Press ▲ and ▼ keys to scroll until display shown as above.



3. Press **enter** to view the offset. A series of dashes "- - -" will be displayed if the unit has not been standardized



4.1.3 P3.0 pH Buffer Group

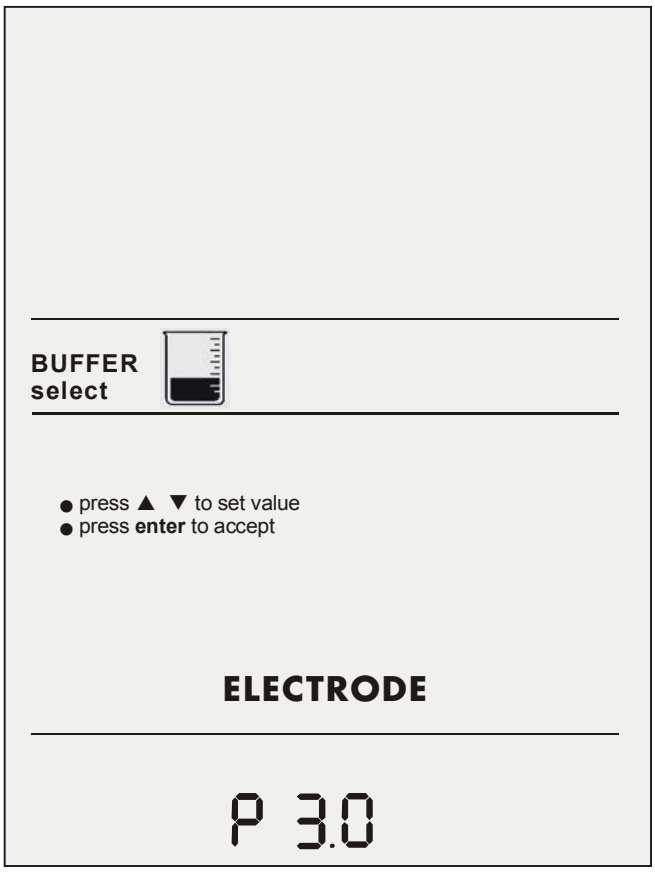
This setup option allows you to select from 3 different buffer groups, each containing 5 buffers, for auto buffer recognition.

The 3 buffer groups are:

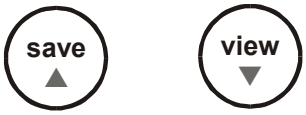
USA buffers:	2, 4, 7, 10 and 12
European buffers:	1, 3, 6, 8 and 10
NIST buffers:	1.68, 4.01, 6.86, 9.18 and 12.46

To Set pH Buffer Group

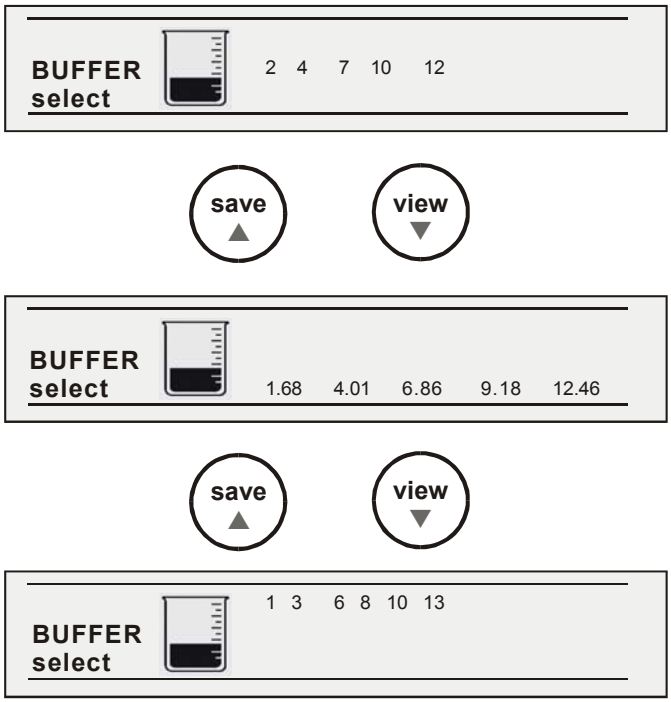
1. Access the Select Buffer menu from the pH Setup Screen by pressing the **setup** key.



2. Press ▲ and ▼ keys to scroll until display shown as above.



3. Press **enter** to make a selection..



print
enter

4. To make a change or selection to the desired buffer group, press **enter** key.

5. Use the ▲ or ▼ keys to scroll through the options available until the desired buffer group is displayed.

6. Press **enter** key to accept the desired buffer group or press **std** key to return to Measure mode without making any changes.

7. Continue to access other setup menu using ▲ or ▼ keys OR press **std** key once to go to next setup page OR press **std** key twice to return to Measure mode.

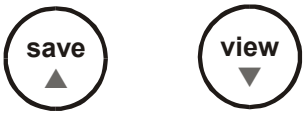
4.1.4 P4.0 pH Resolution

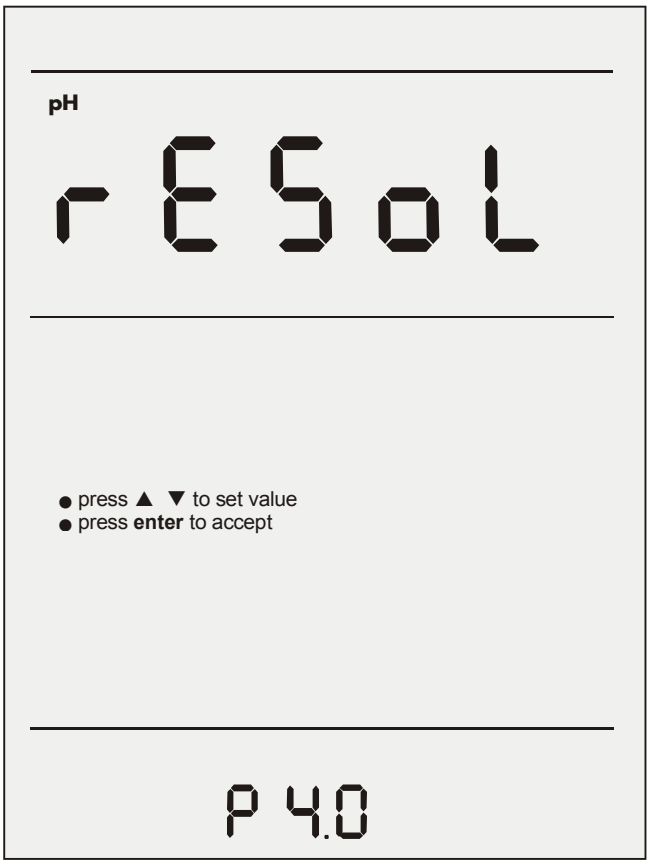
This setup option allows you to select various pH resolution either 0.1, 0.01 or 0.001.

To Select pH Resolution

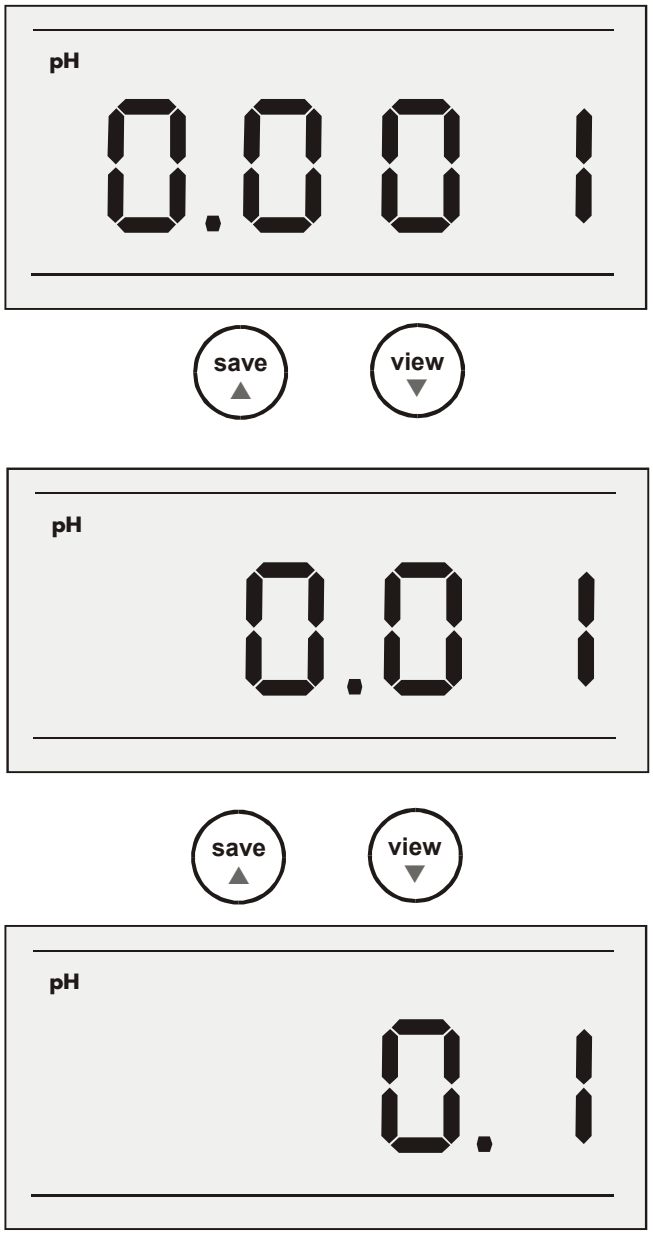
1. Access the Select pH Resolution menu from the pH Measure screen by pressing the **setup** key.

2. Use the ▲ or ▼ key to scroll until the display “rESoL” is displayed.





3. Press **enter** key to make selection and use the ▲ or ▼ key to choose either 0.1 (one decimal place), 0.01 (two decimal place) or 0.001 (three decimal place).



4. Press **enter** key to confirm selection OR press **std** to exit from this page.

5. Continue to access other setup menu using ▲ or ▼ keys OR press **std** key to exit from the setup and return to Measure mode.

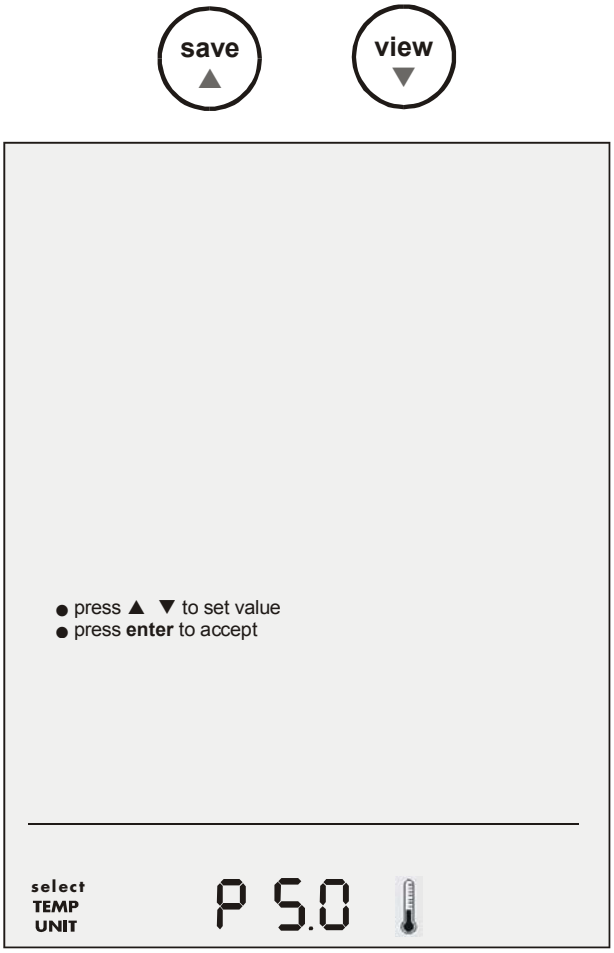
4.1.5 P5.0 Temperature Unit

This setup option allows you to select unit of measure for Temperature either in °C or °F.

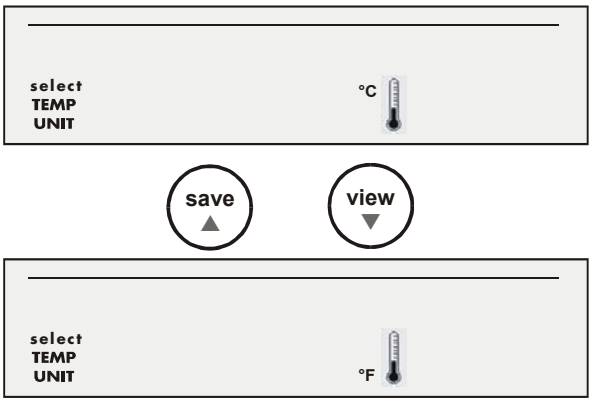
To Select Temperature Unit

1. Access the Select Temperature Unit menu from any parameter Measure screen by pressing the **setup** key.

2. Use the ▲ or ▼ key to scroll until the Select Temp Unit icon is displayed.



3. Press **enter** key to make selection and use the ▲ or ▼ key to choose either °C or °F.



print
enter

4. Press **enter** key to confirm selection OR press **std** to exit from this page.

std

5. Continue to access other setup menu using ▲ or ▼ keys OR press **std** key to exit from the setup and return to Measure mode.

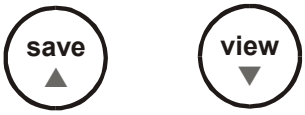
4.1.6 P6.0 Stability Indicator

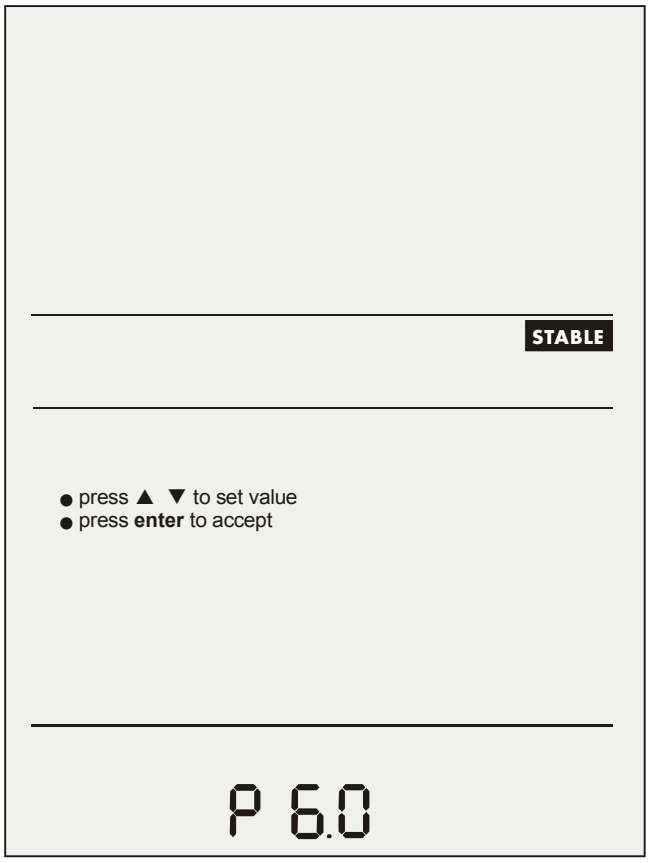
This setup option allows you to set the stability indicator to be displayed on the screen whenever reading has stabilized, thus minimizes guesswork.

To Set Stability Indicator

1. Access the Set Stability Indicator menu from any Measure screen by pressing the **setup** key.

2. Use the ▲ or ▼ key to scroll until the screen displays the **stable** icon is shown.





3. Press **enter** key to make selection and use the ▲ or ▼ key to toggle between NO or YES. Select YES to display stable icon to be shown whenever readings stabilize or NO if no indicator is needed.

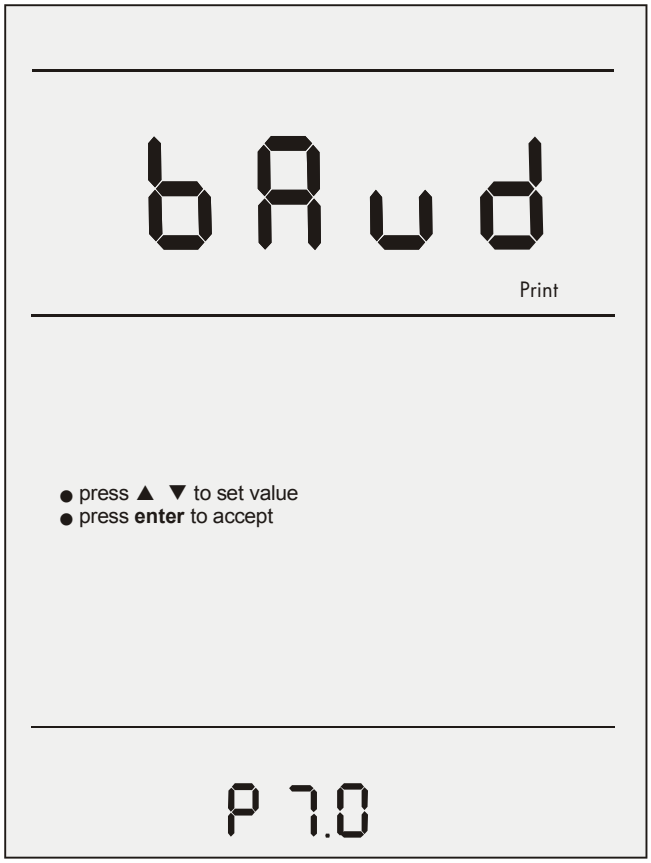
4. Press **enter** key to confirm selection OR press **std** to exit from this page.

5. Continue to access other setup menu using ▲ or ▼ keys OR press **std** key to exit from the setup and return to Measure mode.

4.1.7 P7.0 Baud Rate

This setup option allows you to set the baud rate (bits per second) of the communication protocol interface.

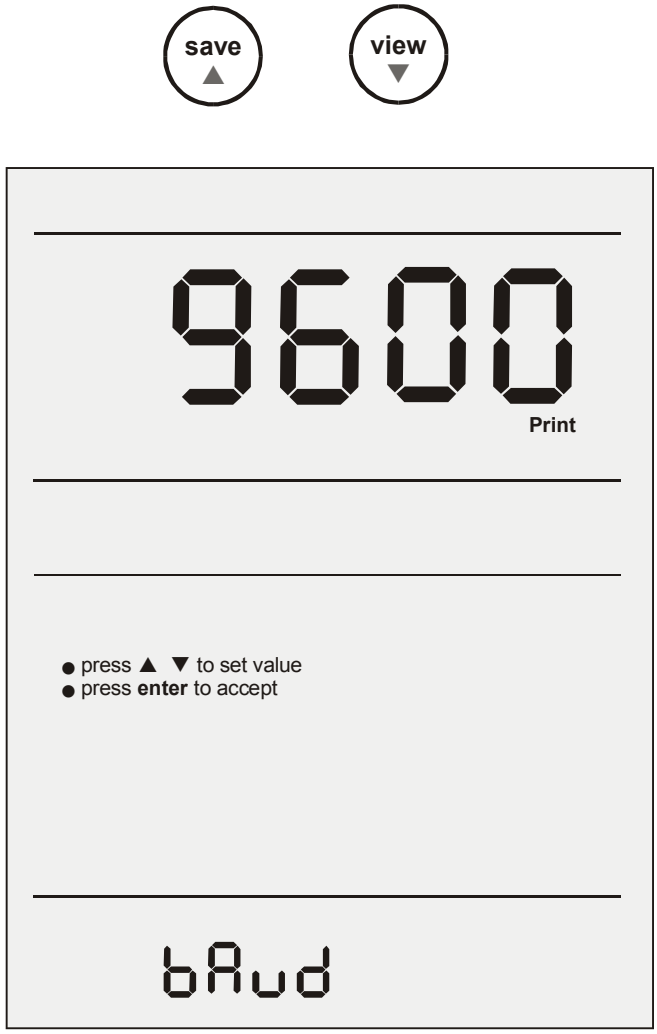
To Set Baud Rate



1. Access the Set Baud Rate menu from any Measure screen by pressing the **setup** key.

2. Use the ▲ or ▼ key to scroll until the screen display as shown.

3. Press **enter** key to make selection and use the ▲ or ▼ key to toggle between 4800, 9600, 19200 and 38400.



4. Press **enter** key to confirm selection OR press **std** to exit from this page.

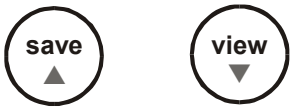
5. Continue to access other setup menu using ▲ or ▼ keys OR press **std** key to exit from the setup and return to Measure mode.

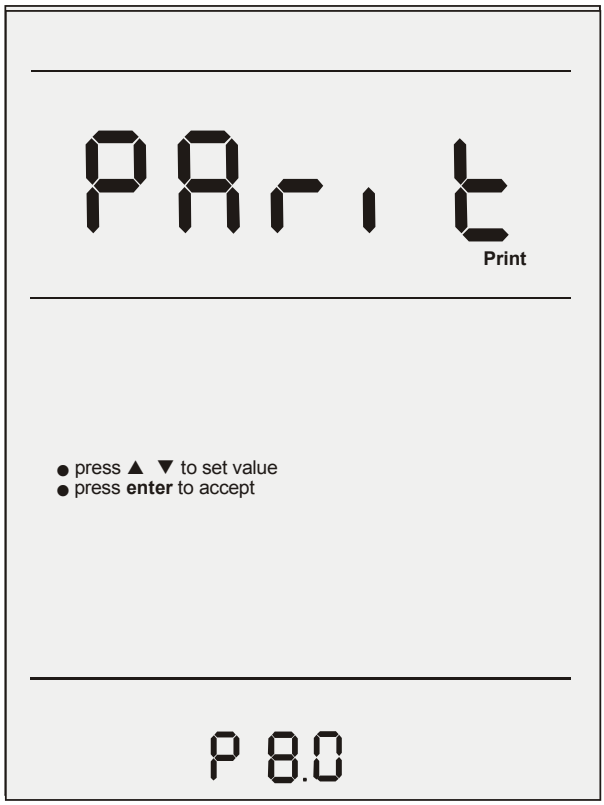
4.1.8 P8.0 Parity Bit

This setup option allows you to set the parity bit of the communication protocol interface.

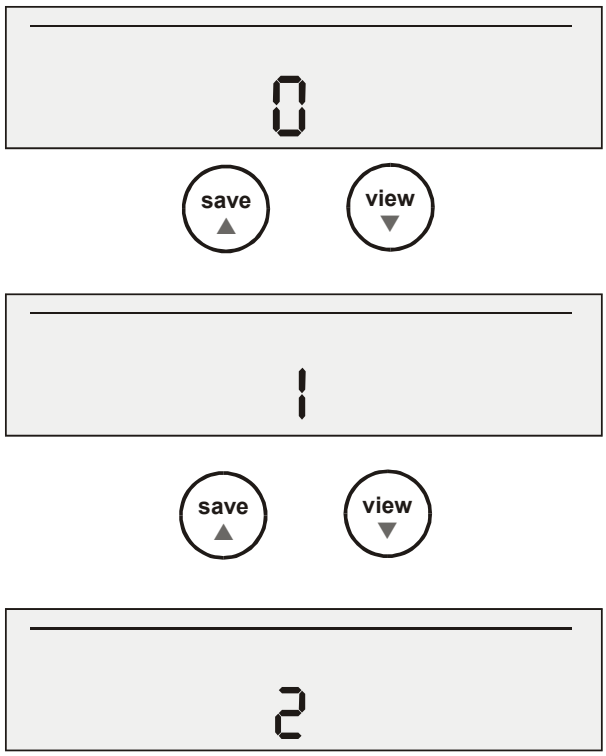
To Set Parity Bit

1. Access the Set Parity Bit menu from any Measure screen by pressing the **setup** key.
2. Use the ▲ or ▼ key to scroll until the screen display as shown.





3. Press **enter** key to make selection and use the ▲ or ▼ key to toggle between 0 (none), 1 (odd) or 2 (even).



4. Press **enter** key to confirm selection OR press **std** to exit from this page.

5. Continue to access other setup menu using ▲ or ▼ keys OR press **std** key to exit from the setup and return to Measure mode.

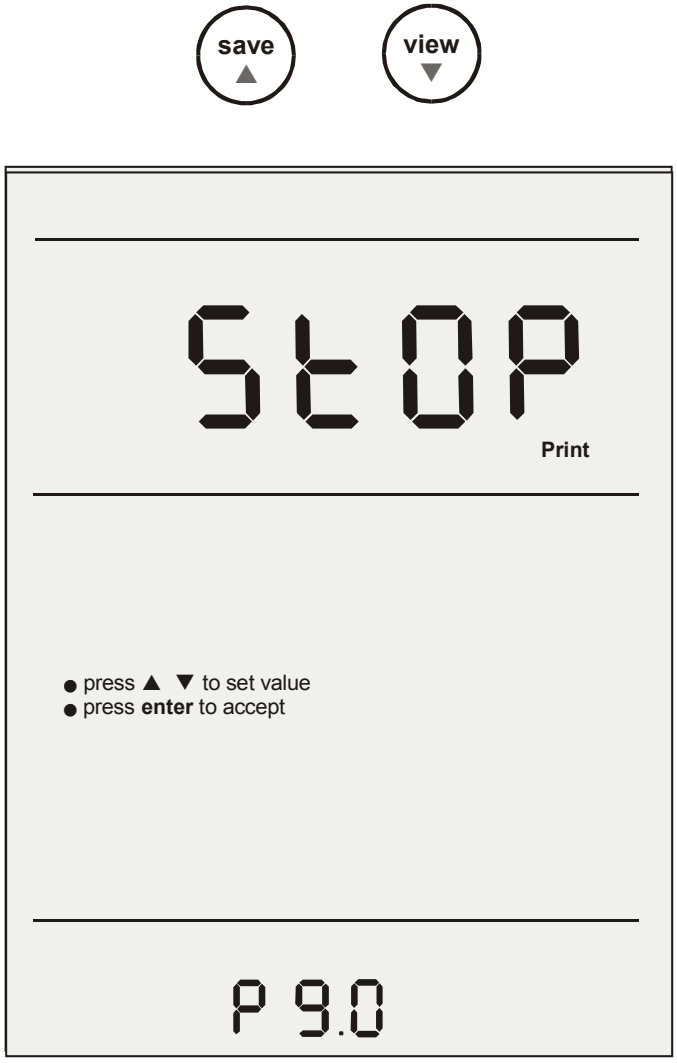
4.1.9 P9.0 Stop Bit

This setup option allows you to set the stop bit of the communication protocol interface.

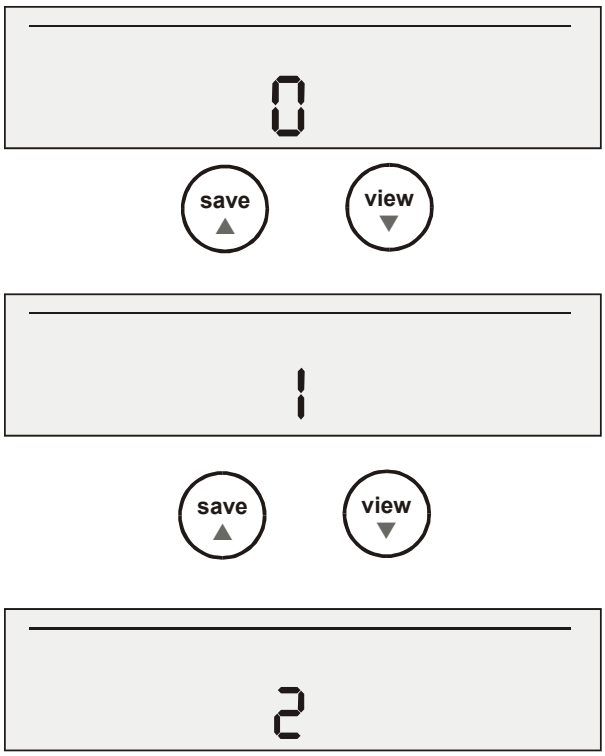
To Set Stop Bit

1. Access the Set Stop Bit menu from any Measure screen by pressing the **setup** key.

2. Use the ▲ or ▼ key to scroll until the screen display as shown.



3. Press **enter** key to make selection and use the ▲ or ▼ key to toggle between 1 or 2.



4. Press **enter** key to confirm selection OR press **std** to exit from this page.

5. Continue to access other setup menu using ▲ or ▼ keys OR press **std** key to exit from the setup and return to Measure mode.

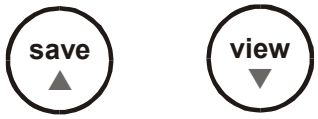
4.1.10 P10.0 Print Data

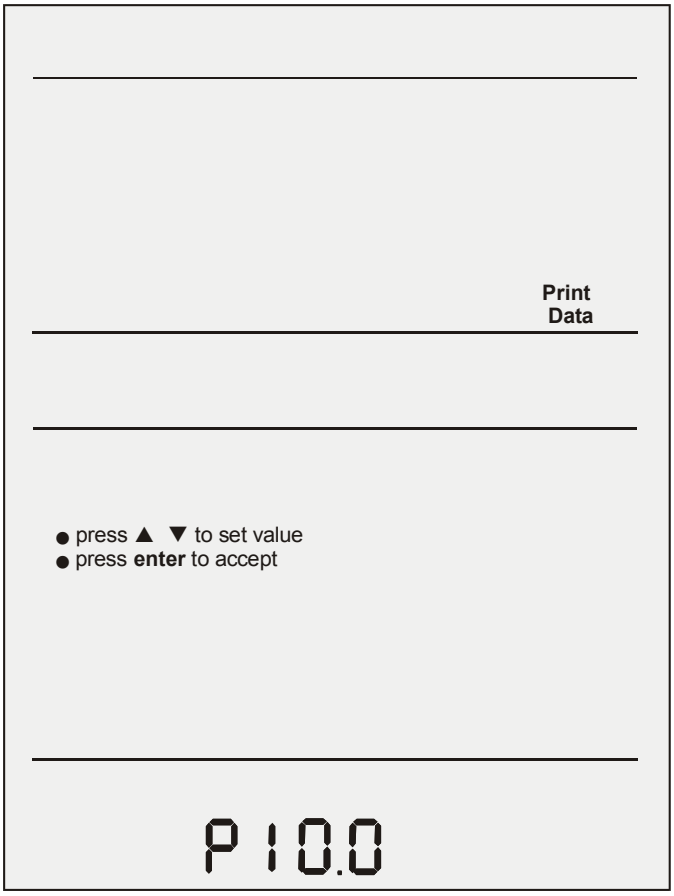
This setup option allows you to print current displayed data or data stored in the meter's memory to a computer or printer via its RS232 interface port. Note all the communication protocol for both the meter and computer/printer must match before successful printing can be performed.

To Select Print Data Option (Current / Memory)

1. Access the Select Print Data Option menu from any Measure screen by pressing the **setup** key.

2. Use the ▲ or ▼ key to scroll until the screen display as shown.





3. Press **enter** key to make selection and use the ▲ or ▼ key to toggle between Current or Memory data print out selection. Press **enter** for the desired selection OR press **std** to exit from this page.

4. Press **enter** key to confirm selection.

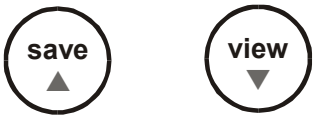
4.1.11 P11.0 Clear Stored Data

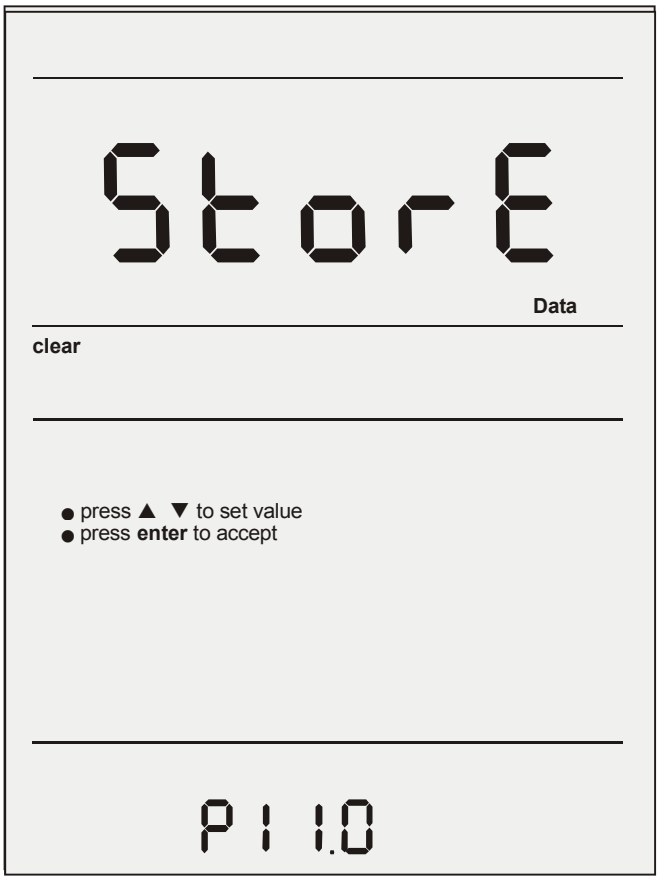
This setup option allows you to clear all stored data sets (from previous measurements) in the meter's memory for new data to be stored. Note old data sets will be overwritten by any new data sets in the event when the stored locations have exceeded.

To Clear Stored Data

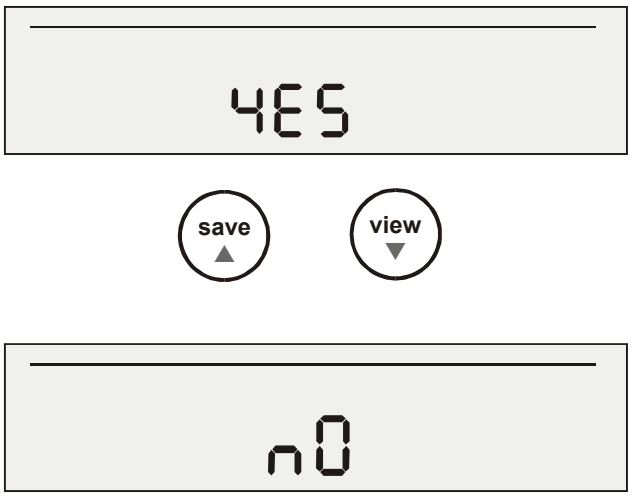
1. Access the Clear Stored Data menu from any Measure screen by pressing the **setup** key.

2. Use the ▲ or ▼ key to scroll until the screen displays as shown.





3. Press **enter** key to make selection and use the ▲ or ▼ key to toggle between NO or YES. Select YES to clear all stored data sets or NO if no change is made.



print enter

4. Press **enter** key to confirm selection OR press **std** to exit from this page.

std

5. Continue to access other setup menu using ▲ or ▼ keys OR press **std** key to exit from the setup and return to Measure mode.

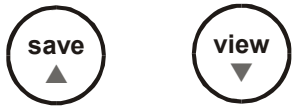
4.1.12 P12.0 Clear Buffer Values

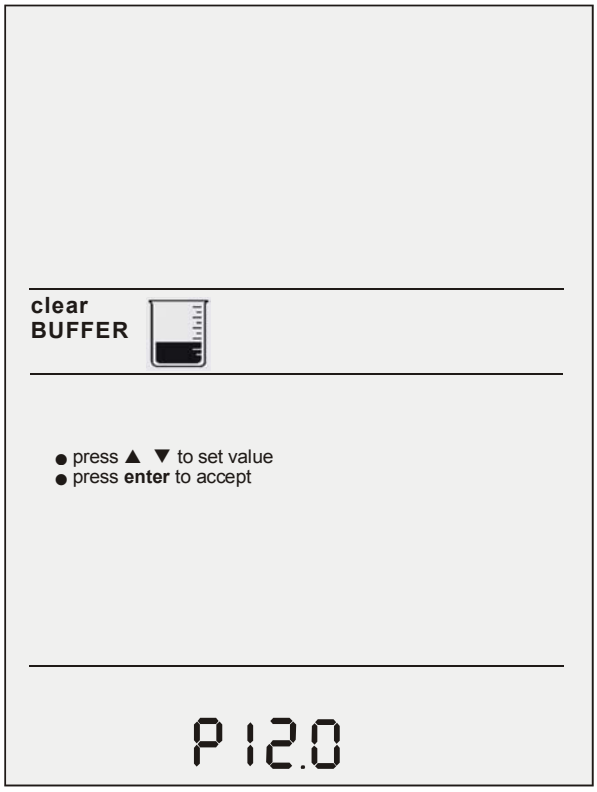
This setup option allows you to clear the standardized buffer values.

To Clear Buffer Values

1. Access the Clear Buffer Values menu from the pH Measure screen by pressing the **setup** key.

2. Use the ▲ or ▼ key to scroll until the screen displays the clear BUFFER icon along with the previously buffer values being standardized.





3. Press **enter** key to make selection and use the ▲ or ▼ key to toggle between NO or YES. Select YES to clear all the existing buffer values or NO if no change is to be made.

4. Press **enter** key to confirm selection OR press **std** to exit from this page.

5. Continue to access other setup menu using ▲ or ▼ keys OR press **std** key to exit from the setup and return to Measure mode.

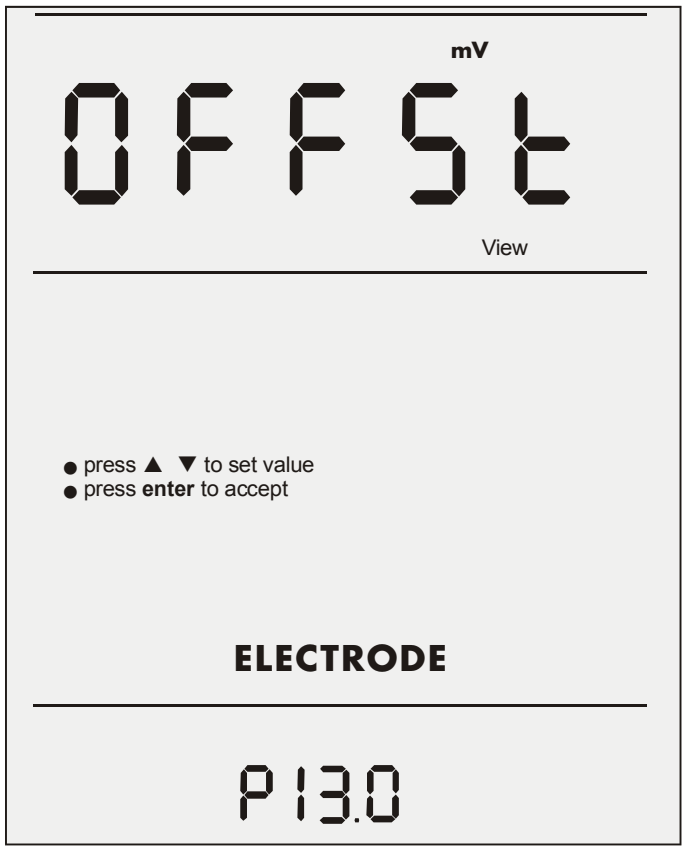
4.1.13 P13.0 View mV offset

This setup option allows you to view the standardized mV offset values.

To view mV offset values

1. Access the View mV offset values menu from the REL mV Measure screen by pressing the setup key.

2. A series of dashes "- - -" will be displayed if the unit has not been standardized

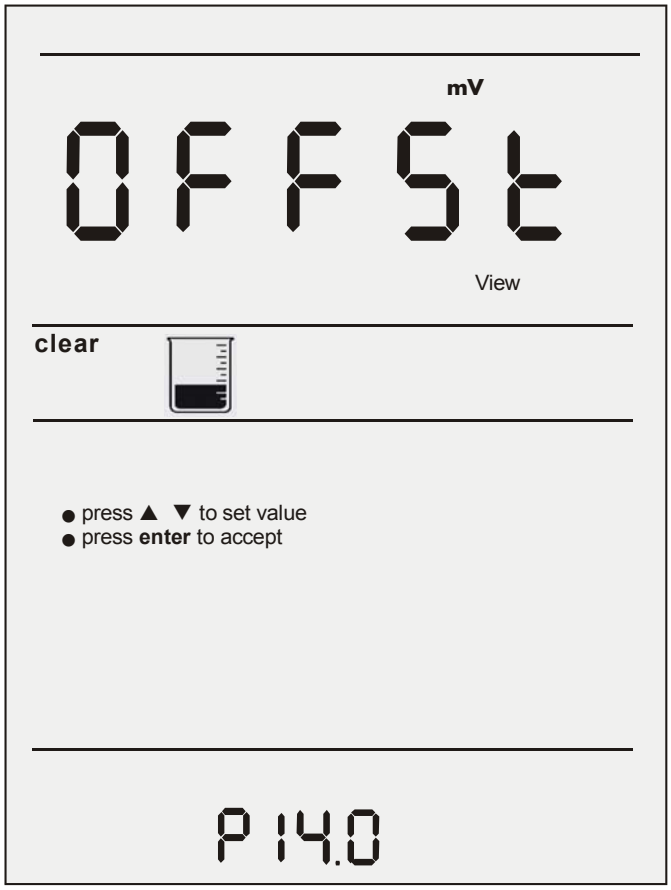


4.1.14 P14.0 Clear mV offset

This setup option allows you to clear the standardized mV offset values.

To Clear mV offset Values

1. Access the Clear mV offset values menu from the REL mV Measure screen by pressing the setup key.
2. Use the ▲ or ▼ key to scroll until the screen displays the Offset screen with the CLEAR icon along.
3. Press **enter** key.
4. Use the ▲ or ▼ key to scroll between YES or NO to clear the REL mV offset values.
5. Press **enter** to confirm the selection.



5 PH OPERATION

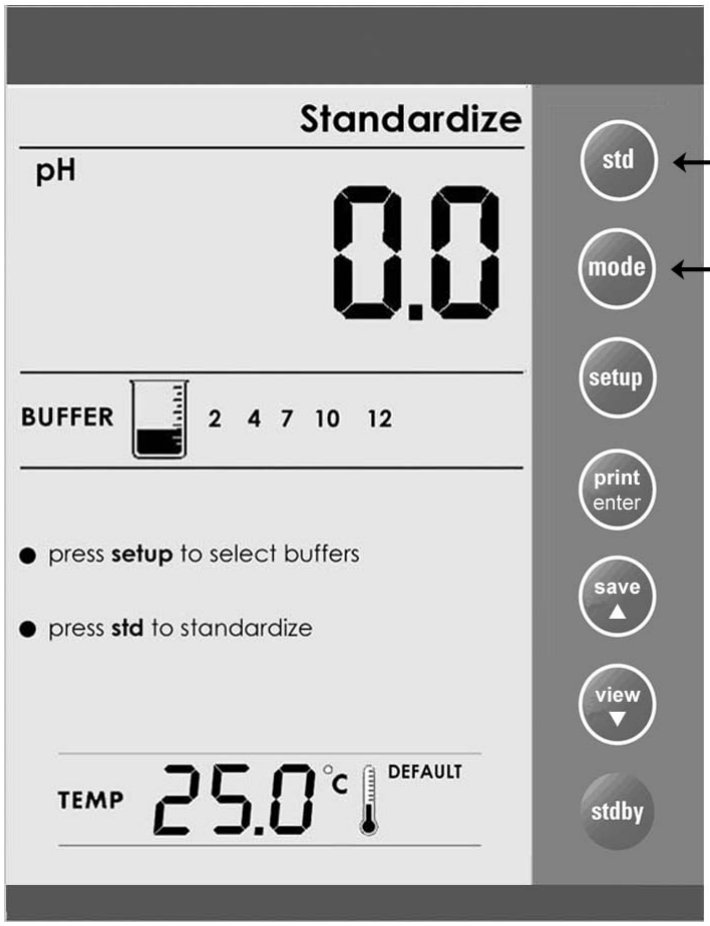
5.1 Standardization

Because electrodes vary in their response, you must standardize or calibrate your pH meter and electrode to compensate for electrode variation. The more frequently you standardize or calibrate, the more accurate your measurements. Standardize at least daily, or more often, for accurate results. The meter allows for automatic calibration with auto buffer recognition for up to 6 buffer values from choice of either 1 of the 3 buffer groups available or 6 custom pH buffer values selected from any of these 3 buffer groups (Depending on buffer selection).

It is recommended that you perform at least 2 point calibration for optimum meter accuracy.

Always rinse the electrode with tap or distilled water between different pH buffers to avoid carry-over.

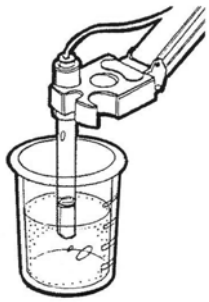
To delete a previous standardization (if performed earlier), refer to the Section 4.1.12 for details on how to clear pH buffer values.



Press **std** key to begin standardization. Similarly pressing **std** key again at the Standardize mode exits and returns to the Measure mode.

Press **mode** key to toggle between different modes until the pH Measure mode is displayed.

Immerse the rinsed electrode(s) into a buffer from the selected buffer group. Stir moderately.



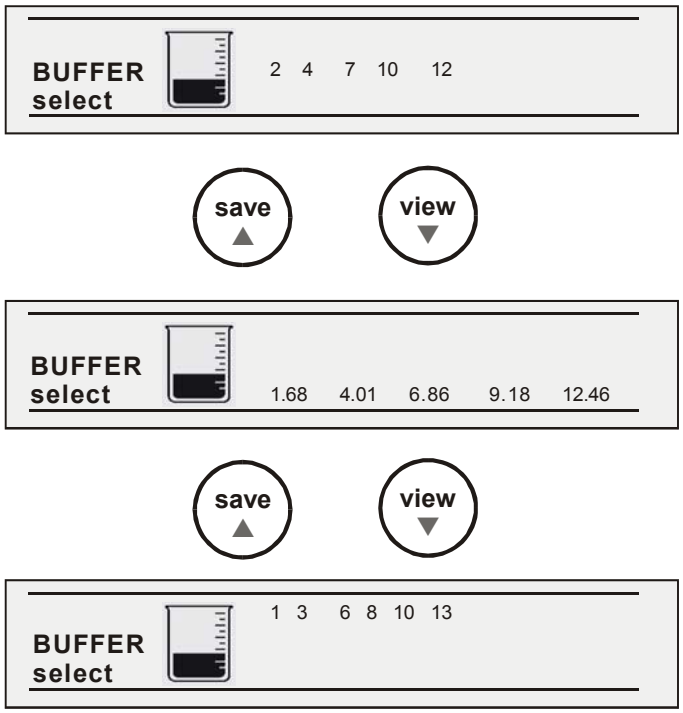
☞

This meter allows for automatic calibration using up to 6 buffers.

A. Using Standard Buffer Group

a. Press **std** key to access the standardize mode while you are in the pH Measure mode.

b. Meter starts scanning the buffer from the already selected buffer group. Proceed to step c to begin standardization. Press **setup** key if you need to select other buffer group. Use ▲ or ▼ key to select desired buffer group and press **enter** key to confirm selection.



c. The meter automatically scans and recognizes the pH buffer being standardized, it locks and displays the closest suitable pH buffer value on the screen. When the **stable** icon appears, the buffer value flashes on the screen, prompting if you wish to confirm the selection.

d. Press **enter** key to make selection. The displayed buffer value flashes momentarily and the meter automatically accepts the calibration point. The first calibration point (pH offset) is successfully performed.

e. If incorrect selection is made or the electrode condition does not meet the meter's criteria, an error message prompts you to troubleshoot or take remedial action. Press **enter** key to escape from the error message window.

f. Repeat the above step c through e for the second and subsequent calibration points. Meter automatically returns to the Measure mode after the last 5th calibration point has been performed. In the pH Measure mode, the screen shows all the buffer values being standardized. An error message Err2 will be displayed if there is more than 6 points pH standardization being performed.

Note:
If the “EURO” buffer is selected, meter returns to measurement mode automatically after 6th point calibration.

B. Using Custom Buffer Values

a. Press **std** to access the standardize mode while you are in the pH Measure mode.

b. Proceed to step c to begin standardization. Press **setup** key if you need to select other buffer group. Use ▲ or ▼ key to select desired buffer group and press **enter** key to confirm selection.

c. The meter automatically scans and recognizes the pH buffer being standardized; it locks and displays the closest suitable pH buffer value on the screen. When the **stable** icon appears, the buffer value flashes on the screen, prompting if you wish to confirm the selection.

d. Press **enter** key to make selection. The displayed buffer value flashes momentarily and the meter automatically accepts the calibration point. The first calibration point (pH offset) is successfully performed.

e. If incorrect selection is made or the electrode condition does not meet the meter's criteria, an error message prompts you to troubleshoot or take remedial action. Press **enter** key to return to standardization using correct buffer values.

f. However for custom buffer values, the next buffer value must be **more than 2 pH apart** from the last standardized buffer value. When standardizing the second or subsequent buffer value, the screen scans and displays the rest of not-standardized buffer values.

g. To select other buffer value from another buffer group, press the **setup** key and use ▲ or ▼ key to choose the desired buffer group. Press **enter** key to confirm selection.

h. Similarly the meter scans, displays the available not-standardized buffer values of the buffer group and locks onto the closest buffer value for your selection.

i. Press **enter** key to confirm selection.

j. Repeat the above step g through i for the subsequent calibration points. Meter automatically returns to the Measure mode after the last 5^{th} calibration point has been performed. An error message Err2 will be displayed if there is more than 6 points pH standardization being performed.

k. In the pH Measure mode, the screen shows all the buffer values being standardized.

☞ When the ATC probe is connected, the meter will continually adjust for temperature. Therefore the buffer values may vary slightly from the nominal values because of temperature variations.

5.2 pH Electrode Diagnosis Indicator

There is an electrode diagnosis icon that indicates the condition of pH electrode being used.

The STABLE icon will appear once the reading is stabilised. If the meter is calibrated with 2 or more points, then meter displays the electrode characteristic indicator bar with appropriate segments.

All	3 segments lighted:	102% < Slope < 90%
	2 segments lighted:	90% < Slope < 80%
	1 segment lighted:	80% < Slope < 70%
	None lighted:	Slope < 70%

mV measurement (absolute)
Press the **mode** to go to the mV measurement mode. Meter displays the current mV value with stable icon if the reading is stable.

REL mV measurement
Press the **mode** key to select the REL mV measurement mode. Meter displays the REL mV value if the meter has already been standardized. Otherwise it displays the absolute value of the oRP solution.

Temperature measurement

If the temperature probe is not connected then meter displays 25°C in pH1500 model or manually adjusted temperature value in pH 1500 and default icon on the secondary display.
If the temperature probe is connected then meter senses the actual temperature and displays it with ATC icon.

Memory in/ Recall functions
While in the measurement mode, by pressing the ▲ key will store the displayed data in the non-volatile memory.

While in the measurement mode, by pressing the ▼ key will retrieve data from the non-volatile memory on last in first out basis. (LIFO)

By pressing **enter** key user can scroll through the rest of the memory locations.

Serial communication interface (RS232)

Meter will be able to communicate with PC which has the user interface software installed. Serial printer can also be connected to the meter to get the print out of the current displayed data or data stored in the memory by pressing enter/ print key.

Error messages

Err: Communication receive buffer is overflowing
Err1: Communication error due to baud rate/ parity/ frame/ stop
Err2: More than 6 points pH calibration

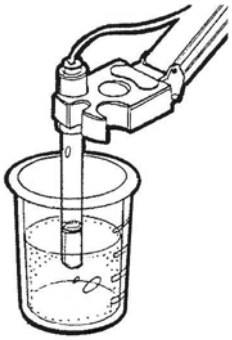
6 mV OR RELATIVE mV OPERATION

6.1 Absolute mV

Millivolts (mV) measurement is used primarily for measuring redox potential (also known as ORP, oxidation reduction potential). You will normally use a platinum ORP electrode, combined with a reference electrode, to measure redox potential (ORP) of a test sample. ORP measurements indicate the oxidizing or reducing capability of a solution. You can also use ORP values to monitor or control solutions requiring a set amount of oxidants or reductants. Calibration of ORP is not necessary. However it is essential to cross-reference using known Quinhydrone or Pre-treatment ORP solutions to ensure good working condition and response of ORP electrode being used from time to time.

1. Press **mode** key until your meter displays the mV mode.

2. Immerse the electrode in a sample solution.



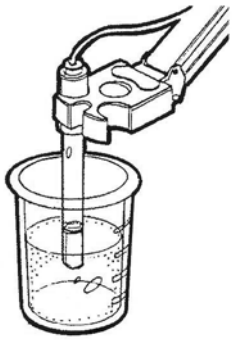
3. The stable icon appears when reading stabilizes. The reading may be recorded at this time by storing into meter's memory using ▲ **save** key.

6.2 Relative mV

The Relative mV mode helps you to standardize certain analytical and monitoring activities such as filtrations.

1. Press **mode** until your meter displays the Relative mV mode.

2. Immerse the electrode in a sample solution.



3. Press **std** and use the ▲ or ▼ keys to adjust the mV value to the std solution value. Press **enter** key to confirm the adjustment.

Note: Maximum adjustable mV offset value is ±150.0 mV.

6.3 Temperature Calibration

1. Press mode to go to the absolute mV measure screen

2. Press std. this will take you to the temperature calibration (MTC or ATC)

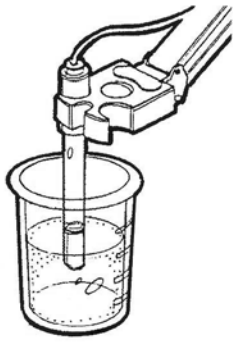
3. Press p or q to adjust the temperature.

4. Press enter to confirm the reading.

Note: Maximum adjustable temperature offset is ±5°C/ 9°F.

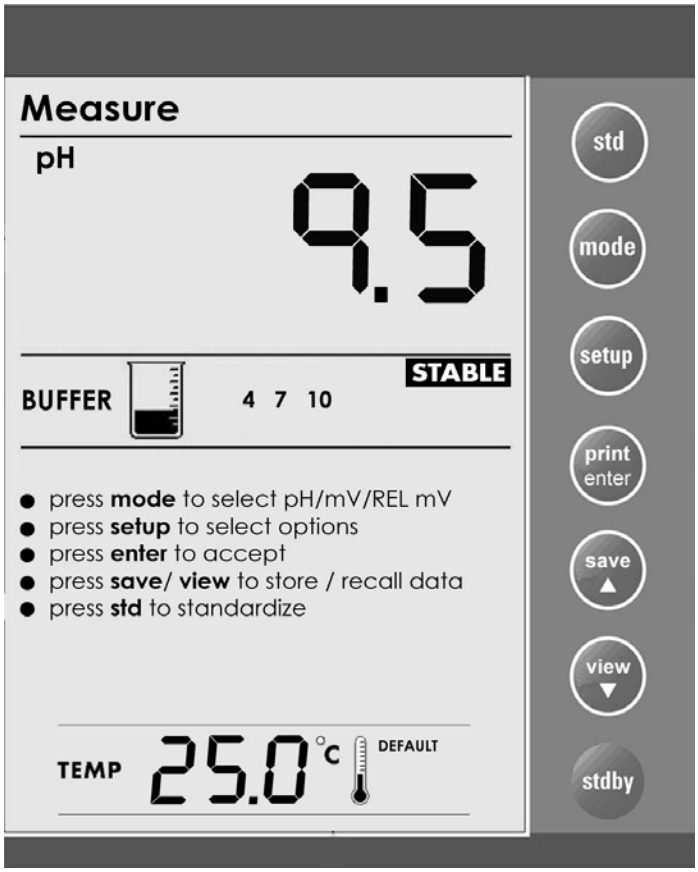
7 MEASUREMENT

1. Immerse the electrode (along with temperature probe if available for the measurement of pH) into the sample solution. Stir moderately.



Make sure that the meter is in the Measure mode.

2. When the meter senses that the reading has stabilized, the stable icon will appear under the reading. The reading may be recorded at this time.



☞ Stirring with a magnetic stir bar and stirrer provides faster electrode response.

8 MEMORY

8.1 Store Value Into Memory

In any Measure mode, press ▲ **save** key to store the displayed reading into the meter's non-volatile memory. A memory location is shown momentarily and the meter returns to the Measure mode.

8.2 Recall Value From Memory

In any Measure mode, pressing ▼ **view** key retrieves data from the meter's memory on the Last-In-First-Out (LIFO) basis. The screen displays the last stored memory location. To view stored data in that particular memory location, press **enter** key. If you wish to view data at specific memory location, use ▲ or ▼ key to scroll and select. Press **enter** key to view data contents.

Pressing **enter** key repeatedly allows you to view data contents until a series of dashes appear on the display which indicates an empty data location.

Pressing **std** key allows you to return to the Measure mode in any sequence of memory recall.

9 PRINT DATA

9.1 Printing Data

Depending on the print option in the meter setup, pressing **print** key allows you to print either current displayed reading or stored data from meter to a PC or printing device via a RS232 communication cable. Ensure that both meter and peripheral have the same configuration in terms of baud rate, parity bit and stop bit. Please check with the printer's or peripheral's manufacturers for details of any specific settings of the device in use.

If there is an error message during operation, the screen displays Err1 as shown below. This indicates a communication error due to incorrect baud rate, parity or stop bit being selected. Press **std** key to return to the Measure mode.

10 pH THEORY

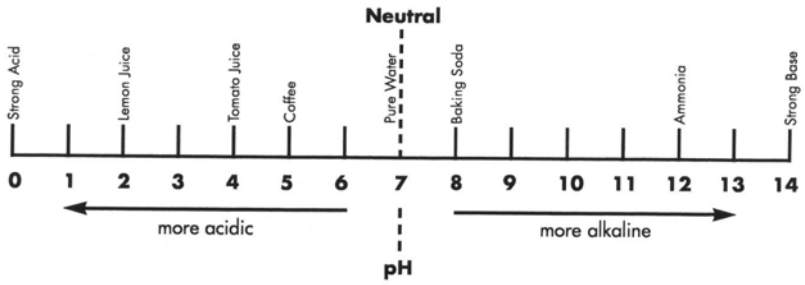
The measurement of pH plays an important role in quantifying and controlling acidity and alkalinity levels for industry and research. pH is a measure of the acidity or alkalinity of a solution and can be represented by this equation:

pH= -log [H+]

With [H+] representing the concentration of hydrogen ions in the solution. pH is sometimes referred
to as power of the hydrogen ion in a solution.

By using a pH meter, you can most precisely determine exact pH levels of solutions. For example, rather than saying that lemon juice is quite acidic, you can say that lemon juice has a pH of 2.4. an exact pH value is often required to control or optimise acidity levels for manufacturing processes or for basic research.

pH values generally range from 0 to 14, with a pH value of 7 being the neutral point, or the value of pure water. The pH values above the neutral point represent increasing alkalinity, whereas pH values below the neutral point represent increasing acidity.



10.1 Measuring pH

To measure pH, the meter receives a millivolts signal from a glass bulb electrode that is sensitive to hydrogen ions. Therefore the potential developed at the glass bulb is directly related to the pH of the solution.

The glass bulb electrode is paired with a reference electrode which completes the electrical measuring circuit and provides a stable reference point. These two electrodes can be separated or they can be joined to create a combination electrode. The combination glass electrode makes a single connection to the pH meter which converts the electrodes millivolts output to pH unit, and displays the result.

This meter can also use a field effect transistor (FET) electrode for measuring pH. This type of electrode employs an ion-sensitive solid state membrane as part of a transistor to measure the hydrogen ion concentration of a solution. The FET is paired with a reference electrode and counter electrode that maintain a constant potential while the FET responds to the sample.

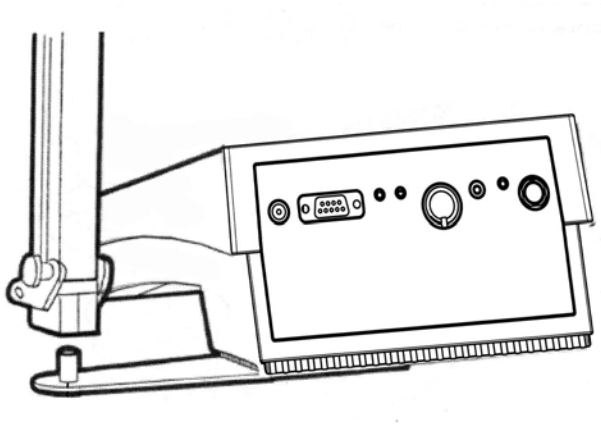
11 CLEANING

This meter requires no regular maintenance, but it is recommended to occasionally wipe down the front with a damp cloth from time to time. If there are any further questions regarding maintenance, call the Eutech Instruments Technical Support hotline at (+65) 6778 6876.

12 TROUBLESHOOTING

Most troubles arise out of a problem with the electrode, not the meter. However, a meter check can be performed, and is simple to do.

1. To test the meter for correct operation, install the BNC (input) shorting cap. Press the mode key to access the mV mode, and note the mV reading. If the meter reads 0+/-1 mV, it is measuring correctly.



2. The meter will display Electrode Error when it detects an error in electrode response. During standardization, the message indicates that the electrode has a slope of less than 90% or more than 102%. The Electrode Error message can indicate a bad electrode(s), bad buffer(s) or a bad standard sequence technique.

13 METER SPECIFICATIONS

Display	Custom LCD
Screen Size	7.2 x 10.6 cm
Measurement display height	5.5 cm
Temp./others display height	1.6 cm
Keypad controls	7 keys (membrane)
Memory	
Internal Diagnostics	yes
pH Mode	
Range	-1.999 to 19.999
Resolution	0.1/0.01/0.001
Relative Accuracy	± 0.002
Automatic Buffer Recognition	yes
Calibration Points	5/6
FET	yes
mV Mode	
Range	-1800.0 to 1800.0
Resolution	0.1
Accuracy	± 0.2
Temperature Mode	
Range	-5 to 105 ^{o}C 9 (23°F or 221°F)
Resolution	0.1
Accuracy	± 0.3 ^{o}C
General	
Inputs/ outputs	BNC, Pin, ATC, DIN (for FET)
Electrical Requirements	115/60 230/50
Impedance	$>10^{12}$ ohms
Meter Size	14.0 X 19.5 X 8 cm
Meter Weight	650 g
RS232 Input	

14 ACCESSORIES

Consult your Authorized Distributors for these items and other range of specialized pH electrodes or Ion Selective Electrodes.

Replacement Meter & Meter Accessories

EC-FG73504-01B	Refillable Glass-body combination pH electrode with 1m cable length and BNC connector
EC-FC72522-01B	Sealed polymer gel plastic-body combination double junction pH electrode with 1m cable length and BNC connector
EC-FC72522R-01B	Refillable plastic-body combination double junction pH electrode with 1m cable length and BNC connector
EC-FC79602-01B	Sealed polymer gel plastic-body double junction ORP electrode with 1m cable length and BNC connector
EC-FC79602R-01B	Refillable plastic-body combination double junction ORP electrode with 1m cable length and BNC connector
	Temperature probe (for ATC)
EC-DAS2000	Data Acquisition Software in WINDOWS © version (1 unit of CD-ROM)
ECCA01M09F09	Meter to computer communication 1 m cable length (9-pin female to 9-pin male)
ECCA01M09F25	Meter to computer communication 1 m cable length (9-pin male to 25-pin female)
ECCA01M09M25	Meter to computer communication 1 m cable length (25-pin male to 25-pin male)
60X130115	110/120V AC/DC 9V 500mA power adapter (50/60 Hz) – 2-flat pin type centre negative, US
60X130117	220/230V AC/DC 9V 500mA power adapter (50/60 Hz) – 3-flat pin type centre negative, UK
60X130118	220/230V AC/DC 9V 500mA power adapter (50/60 Hz) – 2-round pin type centre negative, Euro

Calibration Solutions

EC-BU-1BT	pH 1.68 calibration buffer (480ml bottle)
EC-BU-4BT	pH 4.01 calibration buffer (480ml bottle)
EC-BU-7BT	pH 7.00 calibration buffer (480ml bottle)
EC-BU-10BT	pH 10.01 calibration buffer (480ml bottle)
EC-BU-12BT	pH 12.45 calibration buffer (480ml bottle)
EC-DPC-BT	Protein Cleaning Solution for pH electrode (480 ml per bottle)
EC-RE-005	Storage Solution for pH electrode (480 ml per bottle)
EC-RE-001	Ag/AgCl Electrolyte with Ag/AgCl (for refilling electrode)
EC-ORP-PRE	Pre-treatment Solution 475mV (480ml bottle)
EC-ORP-QUIN	Quinhydrone 255mV (480ml bottle)
EC-AST-PK	pH sachet assortment pack; 5 each of pH4.01, 7.00, 10.01 and deionized water (20 x 20 ml per box)
EC-BU-4BS	pH 4.01 buffer sachets (20 x 20 ml per box)
EC-BU-7BS	pH 7.00 buffer sachets (20 x 20 ml per box)
EC-BU-10BS	pH 10.01 buffer sachets (20 x 20 ml per box)
EC-RIN-WT	Deionised water rinse sachets (20 x 20 ml per box)
EC-PH-ELSTDC	Electrode Stand for bench meter

☞ For a complete selection of electrodes and accessories, please contact your Eutech Instruments nearest distributor or sales representative for details.

15 WARRANTY

Eutech Instruments supplies this bench meter with a 3-year warranty and 6-month warranty for electrode against manufacturing defects from the date of purchase. If repair or adjustment is necessary and has not been the result of abuse or misuse within the warranty period, please return, freight prepaid, and correction will be made without charge. Out of warranty items will be repaired on a charge basis.

Exclusions to the Warranty

The warranty shall not apply to defects resulting from:

- Improper or inadequate maintenance by customer;
- Unauthorized modification or misuse;
- Operation outside of the environmental specifications of the products.

Return of Items

Authorization must be obtained from your Eutech Instruments' Authorized Distributor or Eutech Instruments' Customer Service Dept. before returning items for any reason. When applying for authorization, please include data regarding reason the items are to be returned.

Packing the item for repair should be done using the original packaging or material, with information about any fault identified.

Shipment damage as a result of inadequate packaging is your or your distributor's responsibility, whoever applicable.

Note:
Eutech Instruments reserves the rights to make improvements in design, construction, and appearance of products without notice.

16 NOTICE OF COMPLIANCE

Warning
This meter generates, uses, and can radiate radio frequency energy. If not installed and used properly, that is in strict accordance with the manufacturer's instructions, it may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area may cause interference, in which case the user, at his own expense, will be required to take whenever measures may be required to correct the interference.

This product is to be used only as described in the manual. This product is for indoor use only, and must be used in a well ventilated area.

Warning!
To meet or exceed FCC regulations and comply with CE requirements, the Eutech Instruments supplied power supply must be used. Use of a power supply that is not approved by Eutech Instruments may cause safety hazards and/or cause unit to exceed EMC limits and/or damage unit. When using his meter with a computer or printer, a shielded RS232 cable must be used to meet or exceed FCC regulations, and comply with CE Mark requirements.

For more information on Eutech Instruments products, contact your nearest Eutech Instruments distributor or visit our website listed below:

Manufactured by:	***Distributed by:***
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